Alaska Department of Fish and Game
Division of Wildlife Conservation
September 2003

Identifying and Evaluating Techniques for Wildlife Habitat Management in Interior Alaska

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Research Performance Report
1 July 2002–30 June 2003
Federal Aid in Wildlife Restoration
Grant W-33-1, Study 5.0

This is a progress report on continuing research. Information may be refined at a later date.

FEDERAL AID
ANNUAL RESEARCH PERFORMANCE REPORT

ALASKA DEPARTMENT OF FISH AND GAME
DIVISION OF WILDLIFE CONSERVATION
PO Box 25526
Juneau, AK 99802-5526

PROJECT TITLE: Identifying and evaluating techniques for wildlife habitat management in Interior Alaska

PRINCIPAL INVESTIGATORS: Dale A Haggstrom and Thomas F Paragi

COOPERATORS: Alaska Bird Observatory (ABO), Alaska Department of Environmental Conservation (DEC), Alaska Department of Natural Resources (DNR), Bureau of Indian Affairs (BIA), Bureau of Land Management (BLM), Doyon Limited, Tanana Chiefs Conference (TCC), The Ruffed Grouse Society (RGS), Toghotthele Corporation, US Fish and Wildlife Service (FWS), and the University of Alaska Fairbanks (UAF)

FEDERAL AID GRANT PROGRAM: Wildlife Restoration

GRANT AND SEGMENT NR.: W-33-1

PROJECT NR.: 5.0

WORK LOCATION: Various locations within ADF&G/Division of Wildlife Conservation (DWC), Region III

STATE: Alaska

PERIOD: 1 July 2002–30 June 2003

I PROGRESS ON PROJECT OBJECTIVES

OBJECTIVE 1: Work with state and federal agencies and the private sector to plan, coordinate, and implement forest management activities to maintain or improve wildlife habitat.

Since 1995 we have initiated cooperative projects with the Department of Natural Resources (DNR), Division of Forestry (DOF), and the Ruffed Grouse Society (RGS) to alter the forest structure, age, and composition at both the landscape and stand level to improve wildlife habitat. Approximately 91,147 acres have been treated at 100 sites to date (Table 1).

Landscape-scale habitat treatment is being accomplished with prescribed fire, and involves much greater planning, coordination, and public outreach because of its scale and potential to affect people and lands outside the treated areas. To date, landscape-scale burns have been completed in the East Fork (1998), Mosquito Flats (1999), and Kechumstuk (1999). All 3 burns were located in the Fortymile River drainage north of Tok. Another landscape-

scale burn was attempted near Farewell, southeast of McGrath, during 2001 without success.

The 286,000-acre Western Tanana Flats Prescribed Burn Plan, originally prepared in 1995, was revised and reauthorized in late summer 2001. Planning was completed in summer 2002 for a 30,000-acre landscape-scale prescribed burn in the Robertson River drainage west of Tok. A draft Wolf Lake Prescribed Burn Plan for 16,000 acres of Native Corporation and State land near Tanacross was sent to the Tanana Chiefs Conference (TCC) in 2001.

Stand-scale habitat treatments are divided into 3 categories: (1) post-logging site treatment, (2) ruffed grouse habitat enhancement, and (3) moose habitat enhancement. Post-logging site treatments have included prescribed burning, mechanical scarification, and willow planting. Ruffed grouse (*Bonasa umbellus*) habitat enhancement treatments have included prescribed burning, felling, and shearblading (dozer mounted shearing blade). Moose (*Alces alces*) habitat enhancement has primarily involved willow crushing (standard dozer blade).

These management activities provide the range of treatments needed to evaluate the biological and economic efficacy of prescribed burning and other forestry practices for maintaining or enhancing wildlife habitat (Objective 3). The experience gained can also be applied to broader management decisions regarding fire management (e.g., fuels treatments) and other forestry practices (Objective 2). Prescribed burning requires the use of state and federal firefighters, whereas mechanical treatments are contracted to the private sector. Fire crews are only available for prescribed burns when they are not busy elsewhere with wildland fires and not in training.

The practice of felling aspen without removing the downed trees was discontinued at the Nenana Ridge Ruffed Grouse Habitat Enhancement Project (Nenana Ridge) after completion of the autumn 2001 contracts. Additional contracts will not be let until we finish evaluating whether the resulting debris either restricts use of the new aspen stands by grouse broods or increases predation rates.

OBJECTIVE 2: Encourage prescribed burning and other appropriate forestry practices in developed areas to offset the negative ecological effects of increased suppression of natural fires.

We continued the fire advocacy program in Fairbanks and the surrounding communities that was begun in spring 2001. The purpose of this initiative is to inform the public and various interest groups of the need for prescribed burning, particularly on the Tanana Flats.

Each year, we continue to give presentations on boreal forest succession and disturbance on request at local schools, the University of Alaska Fairbanks (UAF), other State agencies, and other venues.

Comments on the DOF's Forest Land Use Plans and 5-year Schedule of Timber Sales were provided through the ADF&G/Habitat and Restoration Division until the division was

eliminated on 15 April 2003. We now provide comments on wildlife-related issues directly to DOF.

Haggstrom initially served as the ADF&G representative on the planning team that worked on the 5-year revision of the Tanana Valley State Forest Management Plan. The Habitat and Restoration Division assumed this function later in the process, and the review was completed in spring 2003. Paragi has represented the Division of Wildlife Conservation (DWC) on forest planning issues since 2002.

OBJECTIVE 3: Evaluate biological and economic efficacy of prescribed burning and other forestry practices for maintaining or enhancing wildlife habitat.

Tom Paragi was hired in August 1999 to, in part, (a) evaluate whether the habitat enhancement projects implemented since 1995 are meeting management objectives; (b) develop cost-effective ways for area office staff to evaluate habitat enhancement projects; and (c) evaluate the biological and economic efficacy of various habitat enhancement techniques.

The biological efficacy of habitat treatments is being determined by monitoring the response of vegetation and the subsequent animal use or population response, relative to objectives set forth in the treatment prescription. The economic efficacy of treatments, which incorporates both cost and biological response, will be addressed in subsequent reporting periods as we gain information on vegetation and animal responses.

In autumn 1999 we began establishing permanent plots for monitoring regeneration of broadleaf forest at the Nenana Ridge, Two Rivers, and Delta Junction ruffed grouse project areas, the Heritage Forest Outdoor Education and Recreation Site, and the 1996 prescribed burn at Standard Creek. Most sites are aspen forest and all are in the Fairbanks area except the Delta Junction project. The Standard Creek plots will be used to monitor long-term survival of planted feltleaf willow *(Salix alaxensis)* and post-fire density of paper birch (*Betula papyrifera*) and willow.

In 2000 we established line transects for winter track surveys of furbearers, gallinaceous birds, snowshoe hares (*Lepus americanus*), and moose at Nenana Ridge and along the Tok River in the proposed DOF timber sale NC-837-T. Data from multiple counts per winter over several winters will allow statistical comparison of intersection rates, corrected for time since snowfall, among habitat types or treatments. We also established permanent plots for sampling vegetation changes and habitat selection by moose (the latter inferred from winter deposition of fecal pellets) at NC-837-T to monitor habitat and wildlife response to the timber sale and 3 post-logging site treatments.

During 2000–2001 we facilitated the cooperative project “Habitat selection of birds breeding in the Tok River watershed” with the Alaska Bird Observatory (ABO) to determine how the proposed timber sale NC-837-T might influence passerine habitat selection. In 2002 we began a cooperative study with RGS, ABO, and ADF&G/Nongame Program to compare the abundance of selected passerines in treated (felled and burned) and untreated aspen stands at Nenana Ridge.

A kiosk with voluntary reporting cards has been placed along the road at Nenana Ridge each autumn since 2000 to sample grouse hunting success. In addition, staff conducted male ruffed grouse drumming surveys each spring. These data are used for both evaluating grouse response to habitat treatments and tracking the population cycle as part of a larger regional effort by area biologists.

II SUMMARY OF WORK COMPLETED ON JOBS IDENTIFIED IN ANNUAL PLAN THIS PERIOD

JOB 1: Develop operational knowledge necessary to conduct habitat enhancement projects and monitor effectiveness in meeting management objectives.

We continued to obtain current literature on topics germane to study projects. Abstracts were scanned for some citations with the help of administrative staff and put into a ProCite® database for use in research and report writing. We attended a UAF workshop on the Forest Inventory and Analysis Program by the USDA Forest Service.

Haggstrom and Paragi attended an ARC-GIS workshop at UAF.

JOB 2: Plan, design, and conduct habitat management projects to maintain, enhance, or restore wildlife populations.

Landscape-scale habitat treatments

Federal fuels management funding ($68,000) was obtained from the Bureau of Indian Affairs to assist with allotment protection needs associated with the Western Tanana Flats Prescribed Burn Plan. In summer 2003, TCC staff completed preburn treatment of forest fuels on the 3 native allotments most likely to be at risk when the 74,000-acre burn unit #4 is ignited. Fire staff at the DOF Fairbanks Area Forestry office was unable to conduct the burn in 2003. Implementation will remain our highest priority for summer 2004.

Fire staff at DOF/Tok area office was unable to conduct a planned prescribed burn in the Robertson River drainage in 2003. Implementation will remain a priority for summer 2004.

Forestry Program staff at TCC continue to review and revise the draft Wolf Lake Prescribed Burn Plan. Field assessment to determine archaeological and historical site concerns and allotment protection needs was conducted in summer 2002. The Bureau of Indian Affairs allocated $129,000 to assist with allotment protection needs following application from TCC in December 2002. Progress on other allotment issues has been slow. Hopefully, planning for the burn will be completed prior to the summer 2004 fire season.

Funds allocated for the Farewell prescribed burn were reallocated to other program needs.

Stand-scale habitat treatments

1 Post-logging Site Treatment

Two old timber harvest sites, one each at the Nenana Ridge and Standard Creek timber harvesting areas west of Fairbanks, were evaluated for blade scarification to prepare seed beds for both hardwood and coniferous trees. The heavy grass growth in these

units is impeding reforestation efforts. Paragi prepared contracting documents for DOF to finalize and process, and the 37-acre site at Standard Creek was treated in October 2002. The treatments will be evaluated under Job 3 of this study.

2 Ruffed Grouse Habitat Enhancement

Fire crews from the DOF were unable to burn any of the 3 units planned for spring 2003 because of unfavorable fire weather during the short burn window before leaf emergence. The planned burn units are 20.0–26.3 acres each and total 72.4 acres.

3 Moose Habitat Enhancement

No work on crushing projects was completed this period.

Miscellaneous

We continued tracking project expenditures by job and activity using Microsoft Excel for Windows® software, with information available from program receipts, the DOF, and the Alaska Statewide Accounting System.

JOB 3: Design and conduct long-term studies to evaluate the effectiveness of different habitat management techniques and applications.

Vegetation response on landscape-scale habitat treatments

In 2002 we began a study to evaluate the efficacy of using aerial ignition of landscape-scale prescribed fires to restore shrubs and young broadleaf stands typical of early-successional wildlife habitat in boreal forest. We are working with DOF and UAF to complete a vegetative change detection analysis on the East Fork prescribed burn, northwest of Tok. High-resolution (1:12,260-scale) color infrared (CIR) aerial photos were taken on 30 July 2002 and a 2.6 m multispectral (0.6 m panchromatic) Quickbird satellite image was purchased and ortho-rectified. Our CIR photos, and comparable photos from 1981 and 1983 (1:63,360-scale), were digitized and geo-referenced to the Quickbird image. Field visits to the study area to ground truth the Quickbird image were begun in June 2003. Eventually, we will fuse the imagery with a digital elevation model to examine vegetative changes with respect to slope and aspect, and compare the costs of aerial photography to high-resolution satellite imagery.

Vegetation response on stand-scale habitat treatments

We continued to establish permanent sampling plots (1×5 m) for long-term monitoring of aspen response to burning and mechanical treatments at Nenana Ridge. We compared sprouting response between cleared sites and adjacent uncleared sites with debris after having placed recording thermometers in the soil-rooting zone in each debris treatment during the growing season (see Job 4 for windrowing rationale). Data on stem density and the covariates slope, aspect, density class of debris, and herbaceous community composition were collected at the end of the second growing season after disturbance in all instances.

We also continued gathering baseline data in the 12 units that have been selected for study in Block B of the planned NC-837-T timber sale along the Tok River. With the currently

low market value of white spruce, we were also asked by the DOF to consider an option to harvest only about one-third of the study sites per year instead of all 12 in one winter. Thus, we also randomized assignment of treatment sites among years if this design is needed.

In October 2002, five seed traps were placed at each study site in the planned NC-837-T timber sale that is slated for treatment during the first year to obtain an index to annual variation in seedfall by tree species (potentially a confounding effect over time in vegetative response). Traps will be emptied of coniferous and deciduous seeds in spring and fall.

The post-logging broadcast burn of logging slash scheduled for summer 2003 at one of the research plots in the planned timber sale NC-837-T was not completed because timber on the site has not yet been harvested. The DOF now anticipates putting the sale out for bid in autumn 2003.

Post-logging scarification with a dozer blade was conducted in September 2002 on a 25-acre timber sale along the Tanana River east of Delta. Permanent plot stakes were placed and located by GPS in late April to facilitate regeneration studies in the future.

JOB 4: Design and conduct long-term studies to determine the response of wildlife populations to habitat treatments.

Wildlife response to landscape-scale habitat treatments

We have not yet addressed this aspect of the program.

Wildlife response to stand-scale habitat treatments

Spring drumming surveys of male ruffed grouse were again conducted at Nenana Ridge in spring 2003. A kiosk with hunter reporting cards was again used to sample grouse hunting success.

The second round of point-count surveys of selected passerine birds was conducted at Nenana Ridge by ABO staff in June 2003.

Debris from felling and shearblading treatments is denser than debris occurring from natural disturbances in boreal forest. Other researchers who have visited the treatment sites have expressed concern about whether the debris may hinder bird use. Track count data we have collected in prior winters indicate that martens and weasels may preferentially use sites with felling debris, which would heighten predation risk for grouse. We have contracted for debris windrowing on sections of both felling and shearblading treatments to evaluate the effect on vegetative response (see Job 3) and intend to evaluate wildlife use between cleared and debris sites by use of track counts (this Job) and other methods (see Section V).

Track surveys of furbearers, gallinaceous birds, snowshoe hares, and moose were conducted at Nenana Ridge once during winter 2002–2003. Poor snow conditions hindered

more track counts, and ice was unsafe for crossing the river at the proposed Tok River timber sale (NC-837-T).

Paragi and the DOF Delta Resource Forester marked a sample of snags and cavity trees on 3 timber sales in the Delta area in March 2003. Tree features and GPS locations were recorded. Marked trees will be confirmed standing after the sale and post-logging site treatments are completed and will provide a cohort from which to estimate persistence of standing features in an area subject to frequent high winds.

JOB 5: Facilitate greater and more effective use of prescribed burning and other appropriate forestry practices by other state and federal agencies and the private sector, and the subsequent use of cost-effective and appropriate monitoring techniques to evaluate progress toward meeting management objectives.

We continued to review and comment on DOF's 5-year Schedule of Timber Sales and Forest Land Use Plans for the Fairbanks, Delta, and Tok areas.

We continued to work with fire managers at DOF in Fairbanks and natural resources staff at Clear Air Force Site near Anderson to promote options for using shearblading and prescribed fire to maintain aspen clones as wildlife habitat and fuel breaks. Our comments have helped shape the Environmental Assessment for managing natural resources at the military installation. Paragi helped Clear staff mark treatment boundaries and produce GIS maps needed to solicit bids for the work.

Paragi led part of a field tour of shearblading in mixed aspen–spruce forest for fuels management and habitat enhancement near Delta Junction with personnel from the DOF and the US Army. Fort Greely staff contracted about 150 acres of shearblading for habitat enhancement in March 2003 based on techniques we developed, and the fire staff is planning to use similar treatments for creating fuel breaks in 2004.

Paragi served on a panel advising internship opportunities for a new UAF program on cross-disciplinary graduate training in sustainable development (ecology, economics, and social science). An intern will assemble a bibliography on ecological characteristics of age classes in boreal forest that will help define habitats for focusing wildlife inventory work, particularly for nongame species.

Paragi was named co-chair of the Alaska Northern Forest Cooperative that will identify research needs and promote exchange of technical information among researchers, forest managers, and landowners.

JOB 6: Involve and inform other professionals and the general public.

The following activities were completed in the last period on the fire advocacy initiative:

- At our request, the Fairbanks Area Biologist has continued discussions with the Fairbanks and Middle Nenana River Fish and Game advisory committees concerning the need for habitat enhancement on the Tanana Flats and the status of the Western Tanana Flats Prescribed Burn Plan.

- We worked with the new Education Associate for Region III to put prescribed fire information on the ADF&G website, produce a fire poster, and revise the fire leaflets that were displayed during the Outdoor Show at the Carlson Center in Fairbanks and at the Tanana Valley Fair.

- Paragi presented a talk on aspen regeneration at the Northwest Section meeting of *The Wildlife Society* in Eugene, Oregon. He also prepared abstracts for a talk on evaluating the East Fork prescribed burn with satellite imagery and a poster on aspen regeneration for the 2nd International Wildand Fire Ecology and Fire Management Congress to be held in November 2003. Haggstrom also prepared an abstract for a talk on fire management in the wildland–urban interface of Interior Alaska for the November meeting.

- Paragi gave presentations on boreal forest disturbance, forest succession, and wildlife habitat to an undergraduate class at the UAF and visiting field classes from Houghton College (NY) and the Yale School of Forestry.

- A poster and handouts were prepared on aspen treatment projects for the annual banquet of the Interior Alaska Chapter of RGS in February 2003.

- Paragi served as DWC representative on the planning team for Management Unit 2 (lower Tanana and Kantishna Rivers) of the Tanana Valley State Forest. He also represented ADF&G on the Forest Stewardship Committee that meets semi-annually to advise the DOF on awarding of USDA funds for forest management on private lands.

- Paragi gave a presentation on habitat enhancement techniques to the annual meeting of DOF personnel and co-presented a talk that encouraged songbird researchers with Boreal Partners in Flight to record forestry-related information during breeding surveys.

- We visited a 1988 blading treatment site in black spruce in Little Chena drainage with DOF fire staff on 16 January 2003.

- Paragi gave a presentation on habitat surveys in Units 18 and 19D and made recommendations for fire management options in Units 19A and 19B to the moose planning team in Aniak during 4–6 February 2003.

- Paragi gave a presentation on habitat enhancement at a meeting convened 19 March 2003 for Private Lands Wildlife Management on behalf of Native corporations in Interior Alaska.

- Paragi led a discussion at the DWC Region III annual meeting about the effect of population cycles on sampling efforts for gallinaceous birds with respect to the tracking strategy for harvest recently instituted by the Alaska Board of Game.

- A FY02 research performance report and FY04 work plan were submitted to Federal Aid, and a budget request was submitted for FY04.

- A detailed progress report on all projects in Jobs 3 and 4 was completed in spring 2003 to distribute preliminary research findings.

III ADDITIONAL FEDERAL AID-FUNDED WORK NOT DESCRIBED ABOVE THAT WAS ACCOMPLISHED ON THIS PROJECT DURING THIS SEGMENT PERIOD

Paragi worked with the Bethel Area Biologist (Unit 18) in late August to sample moose browse along lower Yukon and Kuskokwim Rivers and conducted a moose browse survey in late March in Unit 19D East as part of the predator–prey research in progress near McGrath.

Paragi coordinated hunter sampling of gizzards from gallinaceous birds for a University of Connecticut (now Swarthmore College) physiologist studying how chemicals in road sand can influence bird ecology.

IV PUBLICATIONS

None.

V RECOMMENDATIONS FOR THIS PROJECT

- Implement the planned landscape-scale prescribed burns on the western Tanana Flats southwest of Fairbanks, in the Robertson River drainage west of Tok, and near Wolf Lake north of Tanacross.

- Implement stand-scale prescribed burns at the Standard Creek timber harvesting area west of Fairbanks.

- Assist with the aspen shearblading project at the Clear Air Force Station.

- Complete the planned aspen burns at Nenana Ridge in spring 2004 and increase the number of units burned annually to aid in the evaluation of the long-term efficacy of prescribed burning as an alternative to mechanical treatments.

- Evaluate additional areas for future treatment.

- Conduct a pilot study at Nenana Ridge in spring 2004 using artificial nests to estimate cause-specific predation rates and plan for a larger effort in 2005–2006 using radiomarked birds, potentially as a graduate project.

- Conduct 2 types of scarification and the first of 3 broadcast burns in summer 2004 at Tok River timber sale NC-837-T, if timber is harvested from the research units during winter 2003–2004.

- Continue sampling efforts associated with ongoing evaluations (e.g., aspen treatments, Tok River timber sale, and furbearer track counts).

- Expand the ground-truthing and GIS analysis now that the digital scenes of vegetation before and after the 1998 East Fork prescribed burn have been acquired.

- Place a metal barrel at Nenana Ridge for collecting wings from harvested birds to complement the reporting cards and contribute to the larger effort of tracking population changes along the Interior road system.

- Separate the research and management aspects of this project into 2 projects since each has different funding and reporting requirements.

VI APPENDIX

None.

VII PROJECT COSTS FOR THIS SEGMENT PERIOD

FEDERAL AID SHARE $76.7 + STATE SHARE $25.6 = TOTAL $102.3

VIII PREPARED BY:

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APPROVAL DATE: _____

Table 1 Summary of accomplishments, 1 July 1995–30 June 2003

Activity	Number of sites treated	Number of acres treated
Landscape-scale prescribed fire	5	89,541
Post-logging site treatment	10	235
Ruffed grouse habitat enhancement	57	675
Moose habitat enhancement	28	696
Total:	100	91,147